HIGH-RESOLUTION LASER SPECTROSCOPY OF S_1-S_0 TRANSITION OF NAPHTHALENE: MEASUREMENT OF VIBRATIONALLY EXCITED STATES

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Naphthalene is one of the simple polycyclic aromatic molecule, and it is interesting that the excited state dynamics take place. To understand the excited state dynamics, rotationally resolved fluorescence excitation spectra of several vibronic bands were measured.[a] [b] In this work, we have measured high-resolution fluorescence excitation spectra across a single mode laser and molecular beam at light angle. Vibronic bands, which lies 2866 cm $^{-1}$ and 3068 cm $^{-1}$ above the 0-0 band ($0^0{}_0$ + 2866 cm^{-1} band and $0^0{}_0$ + 3068 cm^{-1} band), were measured. Absolute wavenumber was calibrated with accuracy 0.0002 cm^{-1} by the measurement of Doppler-free absorption spectrum of I_2 molecule and transmitting light intensity of the stabilized etalon. Rotational lines of the $0^0{}_0$ + 2866 cm^{-1} band were almost resolved. A part of the rotational lines were assigned, and several energy shifts were found. On the other hand, rotational lines were not completely resolved for the $0^0{}_0$ + 3068 cm^{-1} band.

[a] K. Yoshida, Y. Semba, S. Kasahara, T. Yamanaka, and M. Baba, *J. Chem. Phys.* **130,** 19304 (2009)
[b] H. Katô, M. Baba, and S. Kasahara, *Bull. Chem. Soc. Jpn.* **80,** 456 (2007)